Independent Science on the Effects of Wireless Radiation on Human Health and the Environment

There are more than 1,000 scientific studies conducted by independent researchers from around the world concerning the biological effects of Radiofrequency (RF radiation). Here we present some of the most recent studies.

I. Effects on Fetuses
II. Effects on Children and Adolescents
III. Brain Tumors
IV. Parotid Gland Tumors
V. Other Malignancies
VI. DNA Damage and Gene Expression Changes
VII. Neurological/Cognitive Effects
VIII. Cardiovascular Effects
IX. Male Fertility
X. Electromagnetic Sensitivity
XI. Implanted Medical Devices
XII. 5G Effects
XIII. Wildlife and Plants
XIV. Reports, Articles and Reviews

I. Effects on Fetuses

1. Mobile Phone Use During Pregnancy: Which Association With Fetal Growth? Boileau, N., et al. Journal of Gynecology Obstetrics and Human Reproduction 49(8):101852. (2020).
2. Mother's Exposure to Electromagnetic Fields Before and During Pregnancy is Associated with Risk of Speech Problems in Offspring. Zarei, S., et al. Journal of Biomedical Physics and Engineering 9(1):61-68. (2019).
3. Prenatal Exposure to Extremely Low Frequency Magnetic Field and Its Impact on Fetal Growth. Ren, Y., et al. Environmental Health 18(1):6. (2019).
4. Associations of Maternal Cell Phone Use During Pregnancy, Pregnancy Duration And Fetal Growth In Four Birth Cohorts. Tsarna, E., et al. American Journal of Epidemiology 188(7):1270-1280. (2019).
5. Effect of radiofrequency radiation on reproductive health. Singh, R., et al. Indian Journal of Medical Research 148(Suppl 1): S92–S99. (2018).
6. The Effects of Radiofrequency Radiation on Mice Fetus Weight, Length and Tissues. Alimohammadi, I., et al. Data in Brief 19:2189-2194. (2018).
7. Effects of Prenatal Exposure to WiFi Signal (2.45 GHz) on Postnatal Development and Behavior in Rat: Influence of Maternal Restraint. Othman, H., et al. Behavioral Brain Research 326:291-301. (2017).
8. Exposure to Magnetic Field Non-Ionizing Radiation and the Risk of Miscarriage: A prospective Cohort Study. Li, D., et al. Scientific Reports 7(17541). (2017).
9. Postnatal Development and Behavior Effects of In-Utero Exposure of Rats to Radiofrequency Waves Emitted From Conventional WiFi Devices. Othman, H., et al. Environmental Toxicology and Pharmacology 52:239-247 (2017).
10. Lasting Hepatotoxic Effects of Prenatal Mobile Phone Exposure. Yilmaz, A., et al. The Journal of Maternal-Fetal & Neonatal Medicine 30(11):1355-1359 (2017).
11. Multiple Assessment Methods of Prenatal Exposure to Radio Frequency Radiation from Telecommunication in the Mothers and Children's Environmental Health (MOCEH) Study. Choi, KH., et al. International Journal of Occupational Medicine and Environmental Health 29(6):959-972 (2016).
12. A Review on Electromagnetic Fields (EMFs) and the Reproductive System. Asghari, A., et al. Electronic Physician Journal 8(7):2655-2662. (2016).
13. Genotoxicity Induced by Foetal and Infant Exposure to Magnetic Fields and Modulation of Ionising Radiation Effects. Udroiu, I., et al. PLoS One10(11):E0142259. (2015).
14. Oxidative Stress of Brain and Liver is Increased by Wi-Fi (2.45 GHz) Exposure of Rats During Pregnancy and the Development of Newborns. Çelik, Ö., et al. Journal of Chemical Neuroanatomy 75(Pt B):134-139. (2015).
15. Neurodegenerative Changes and Apoptosis Induced by Intrauterine and Extrauterine Exposure of Radiofrequency Radiation. Güler, G., et al. Journal of Chemical Neuroanatomy 75(Pt B):128-133. (2015).
16. Maternal Exposure to a Continuous 900-MHz Electromagnetic Field Provokes Neuronal Loss and Pathological Changes in Cerebellum of 32-Day-Old Female Rat Offspring. Odacı, E., et al. Journal of Chemical Neuroanatomy 75(Pt B):105-110. (2015).
17. Different Periods of Intrauterine Exposure to Electromagnetic Field: Influence on Female Rats' Fertility, Prenatal and Postnatal Development. Alchalabi, A., et al. Asian Pacific Journal of Reproduction 5(1):14-23. (2015).
18. Use of Mobile Phone During Pregnancy and the Risk of Spontaneous Abortion. Mahmoudabadi, F., et al. Journal of Environmental Health Science and Engineering 13:34. (2015).
19. Effects of Prenatal 900 MHz Electromagnetic Field Exposures on the Histology of Rat Kidney. Ulubay, M., et al. International Journal of Radiation Biology 91(1):35-41. (2015).
20. The Effect of Exposure of Rats During Prenatal Period to Radiation Spreading from Mobile Phones on Renal Development. Bedir, R., et al. Renal Failure 37(2):305-9. (2015).
21. Dosimetric Study of Fetal Exposure to Uniform Magnetic Fields at 50 Hz. Liorni, I., et al. Bioelectromagnetics 35(8):580-97 (2014).
22. Influence of Pregnancy Stage and Fetus Position on the Whole-Body and Local Exposure of the Fetus to RF-EMF. Varsier, N. et al. Physics in Medicine and Biology 59(17):4913-26. (2014).
23. Autism-Relevant Social Abnormalities in Mice Exposed Perinatally to Extremely Low Frequency Electromagnetic Fields. Alsaeed, I., et al. International Journal of Developmental Neuroscience 37:58-64. (2014).
24. Pyramidal Cell Loss in the Cornu Ammonis of 32-day-old Female Rats Following Exposure to a 900 Megahertz Electromagnetic Field During Prenatal Days 13–21. Bas, O., et al. NeuroQuantology 11(4):591-599. (2013).
25. The Effects of 900 Megahertz Electromagnetic Field Applied in the Prenatal Period on Spinal Cord Morphology and Motor Behavior in Female Rat Pups. Odaci, E., et al. NeuroQuantology 11(4):573-581. (2013).
26. The Effects of Prenatal Exposure to a 900 Megahertz Electromagnetic Field on Hippocampus Morphology and Learning Behavior in Rat Pups. İkinci, A., et al. NeuroQuantology 11(4):582-590. (2013)
27. Fetal Radiofrequency Radiation Exposure From 800-1900 MHz-Rated Cellular Telephones Affects Neurodevelopment and Behavior in Mice. Aldad, T., et al. Science Reports 2:312. (2012).
28. Cranial and Postcranial Skeletal Variations Induced in Mouse Embryos by Mobile Phone Radiation. Fragopoulou, AF., et al. Pathophysiology 17(3):169-77. (2010).
29. Maternal Occupational Exposure to Extremely Low Frequency Magnetic Fields and the Risk of Brain Cancer in the Offspring. Li, P, et al. Cancer Causes & Control 20(6):945-55. (2009).
30. Reproductive and Developmental Effects of EMF in Vertebrate Animal Models. Pourlis, A.F. Pathophysiology 16(2-3):179-89. (2009).
31. Prenatal and Postnatal Exposure to Cell Phone Use and Behavioral Problems in Children. Divan, HA., et al. Epidemiology 19(4):523-29 (2008).
32. Effects of Prenatal Exposure to a 900 MHz Electromagnetic Field on the Dentate Gyrus of Rats: A Stereological and Histopathological Study. Odaci, E., et al. Brain Research 1238:224–229. (2008).
33. Ultra High Frequency-Electromagnetic Field Irradiation During Pregnancy Leads to an Increase in Erythrocytes Micronuclei Incidence in Rat Offspring. Ferreira, A., et al. Life Sciences 80(1):43-50. (2006).

II. Effects on Children and Adolescents

1. Development of health-based exposure limits for radiofrequency radiation from wireless devices using a benchmark dose approach. Uche, U., et al. Environmental Health, 20(84). (2021).
2. Electromagnetic Fields, Pulsed Radiofrequency Radiation, and Epigenetics: How Wireless Technologies May Affect Childhood Development. Sage, C. & Burgio, E. Child Development 89(1):129-136. (2017).
3. Prospective Cohort Analysis of Cellphone Use and Emotional and Behavioural Difficulties in Children. Sudan, M., et al. Journal of Epidemiology and Community Health 70(12):1207-1213. (2016).
4. Radiofrequency-electromagnetic Field Exposures in Kindergarten Children. Bhatt, C., et al. Journal of Exposure Science and Environmental Epidemiology. 27(5):497-504. (2016).
5. Why Children Absorb More Microwave Radiation than Adults: The Consequences. Morgan, L., et al. Journal of Microscopy and Ultrastructure 2(4):196-204. (2014).
6. A Prospective Study of In-Utero Exposure to Magnetic Fields and the Risk of Childhood Obesity. Li, D., et al. Scientific Reports 2(540). (2012).
7. Exposure to Extremely Low-Frequency Magnetic Fields and the Risk of Childhood Cancer: Update of the Epidemiological evidence. Schüz, J. Progress in Biophysics and Molecular Biology 107(3):339-42. (2011).
8. Cell Phone Use and Behavioural Problems in Young Children. Divan, HA., et al. Journal of Epidemiol Community Health 66(6):524-9. (2010).
9. Exposure to Radio-Frequency Electromagnetic Fields and Behavioral Problems in Bavarian Children and Adolescents. Thomas, S., et al. European Journal of Epidemiology 25(2):135-41. (2009).
10. The Sensitivity of Children to Electromagnetic Fields. Kheifets, L., et al. Deventer Journal of Pediatrics 116(2):303-313. (2005).

III. Brain Tumors

1. Simulation of The Incidence of Malignant Brain Tumors in Birth Cohorts That Started Using Mobile Phones When They First Became Popular in Japan. Sato, Y., et al. Bioelectromagnetics 40(3):143-149. (2019).
2. National Toxicology Technical Report on Cell Phones and Cancer.Toxicology and Carcinogenesis Studies in Sprague Dawley (Hsd:Sprague Dawley SD) Rats Exposed to Whole-body Radio Frequency Radiation at a Frequency (900 Mhz) and Modulations (GSM and CDMA) Used by Cell Phones. National Toxicology Program TR595:1-466. (2018).
3. Report of Final Results Regarding Brain and Heart Tumors in Sprague-Dawley Rats Exposed From Prenatal Life Unitl Natural Death to Mobile Phone Radiofrequency Field Representative of a 1.8 GHz GSM Base Station Environmental Emission. Falcioni, L, et al. Environmental Research 165:496-503. (2018). Summary: https://ntp.niehs.nih.gov/whatwestudy/topics/cellphones/index.html
4. Exposure to Cell Phone Radiofrequency Changes Corticotrophin Hormone Levels and Histology of The Brain and Adrenal Glands in Male Wistar Rat. Shahabi, S., et al. Iranian Journal of Basic Medical Sciences 21:1269-1274. (2018).
5. Brain Tumours: Rise in Glioblastoma Multiforme Incidence in England 1995-2015 Suggests an Adverse Environmental or Lifestyle Factor. Philips, A., et al. Journal of Environmental and Public Health 2018(7910754). (2018).
6. The 2100 MHz Radiofrequency Radiation of a 3G-Mobile Phone and the DNA Oxidative Damage in Brain. Sahin, D, et al. Journal of Chemical Neuroanatomy 75(Pt B):94-98. (2016).
7. Mobile Phone and Cordless Phone Use and the Risk for Glioma - Analysis of Pooled Case-Control Studies in Sweden 1997-2003 and 2007-2009. Hardell, L. et al. PathoPhysiology 22(1):1-13. (2015).
8. Mobile Phone Radiation Causes Brain Tumors and Should Be Classified as a Probable Human Carcinogen. Morgan, L., et al. International Journal of Oncology 46:1865-1871. (2015).
9. Mobile Phone Use and Brain Tumours in the CERENAT Case-Control Study. Coureau, G., et al. Occupational & Environmental Medicine 71(7):514-22 (2014).
10. Pooled Analysis of Case-Control Studies on Acoustic Neuroma Diagnosed 1997-2003 and 2007-2009 and Use of Mobile and Cordless Phones. Hardell, L., et al. International Journal of Oncology 43(4):1036-1044. (2013).
11. Using the Hill Viewpoints from 1965 for Evaluating Strengths of Evidence of the Risk for Brain Tumors Associated with use of Mobile and Cordless Phones. Hardell, L., et al. Reviews on Environmental Health 28(2-3):97-106 .(2013).
12. Use of Mobile Phones and Cordless Phones is Associated with Increased Risk for Glioma and Acoustic Neuroma. Hardell, L., Carlberg, M., et al. PathoPhysiology 20(2):85-110. (2013).
13. Mobile Phones and Head Tumours: A Critical Analysis of Case-Control Epidemiological Studies. Levis, A.G., et al. Open Environmental Sciences 6(1):1-12. (2012).
14. On the Association Between Glioma, Wireless Phones, Heredity and Ionising Radiation. Carlberg, M., et al. PathoPhysiology 19(4):243-252. (2012).
15. Mobile Phones and Head Tumours. The Discrepancies in Cause-Effect Relationships in the Epidemiological Studies - How Do They Arise? Levis, A.G., et al. Environmental Health 10:59. (2011).
16. Indications of Possible Brain Tumour Risk in Mobile-Phone Studies: Should We Be Concerned? Cardis, E., et al. Occupational & Environmental Medicine 68:169-171. (2011).
17. Estimating the Risk of Brain Tumors from Cell Phone Use: Published Case-Control Studies. Morgan, LL. Pathophysiology 16(2-3):137-147. (2009).
18. Cell Phones and Brain Tumors: A Review Including the Long-Term Epidemiologic Data. Khurana, V.G., et al. Surgical Neurology 72(3):205-14. (2009).
19. Epidemiological Evidence for an Association Between Use of Wireless Phones and Tumor Diseases. Hardell, L., et al. PathoPhysiology 16(2-3):113-122. (2009).
20. Mobile Phone, Cordless Phones and the Risk for Brain Tumours. Hardell, L., et al. International Journal of Oncology 35(1):5-17 (2009).
21. Histopathological Examinations of Rat Brains After Long-Term Exposure to GSM-900 Mobile Phone Radiation. Grafström, G., et al. Brain Research Bulletin 77(5):257-63. (2008).
22. Mobile Phone Use and the Risk of Acoustic Neuroma. Lonn, S., et al. Epidemiology 15(6):653-659. (2004).

IV. Parotid Gland Tumors

1. Influence of Handheld Mobiles on Parotid: A Cohort Study. Ranjitha, G., et al. Journal of Indian Academy of Oral Medicine & Radiology 29:254-258. (2017).
2. Does Cell Phone Use Increase the Chances of Parotid Gland Tumor Development? A Systematic Review and Meta-Analysis. De Siqueira, EC., et al. Journal of Oral Pathology and Medicine 46(7) 480-483. (2017).
3. Correlation Between Cellular Phone Use and Epithelial Parotid Gland Malignancies. Duan, Y., et al. International Journal of Oral and Maxillofacial Surgery 40(9):966-972. (2011).
4. Mobile Phones Use and Risk of Tumors: A Meta-Analysis. Myung, SK., et al. Journal of Clinical Oncology 27(33):5565-72. (2009).
5. Epidemiological Evidence for an Association Between use of Wireless Phones and Tumor Diseases. Hardell, L., et al. PathoPhysiology 16(2-3):113-122. (2009).
6. Cell Phone Use and Risk of Benign and Malignant Parotid Gland Tumors - A Nationwide Case-Control Study. Sadetzki, S., et al. American Journal of Epidemiology 167(4):457-467. (2007).

V. Other Malignancies

1. Increased Generational Risk of Colon and Rectal Cancer in Recent Birth Cohorts under Age 40 - the Hypothetical Role of Radiofrequency Radiation from Cell Phones. Davis, D., et al. Annals of Gastroenterology and Digestive Disorders. 3(1):1-8. 2020.
2. The Carcinogenic Potential of Non-Ionizing Radiations: The Cases of S-50 Hz MF and 1.8 GHz GSM Radiofrequency Radiation. Soffritti, M., et al. Basic & Clinical Pharmacology & Toxicology I125(Suppl.3):58-69. (2019).
3. National Toxicology Technical Report on Cell Phones and Cancer.Toxicology and Carcinogenesis Studies in Sprague Dawley (Hsd:Sprague Dawley SD) Rats Exposed to Whole-body Radio Frequency Radiation at a Frequency (900 Mhz) and Modulations (GSM and CDMA) Used by Cell Phones. National Toxicology Program TR595:1-466. (2018). Summary: https://ntp.niehs.nih.gov/whatwestudy/topics/cellphones/index.html
4. Tumor Promotion by Exposure to Radiofrequency Electromagnetic Fields Below Exposure Limits for Humans. Lerchl, A., et al. Biochemical and Biophysical Research Communications 459(4):585-590. (2015).
5. Swedish Review Strengthen Grounds for Concluding that Radiation from Cellular and Cordless Phones is a Probable Human Carcinogen. Davis, DL., et al. Pathophysiology 20(2):123-129. (2013).
6. Multifocal Breast Cancer in Young Women with Prolonged Contact Between Their Breasts and Their Cellular Phones. West, J., et al. Case Reports in Medicine 2013(354682). (2013).
7. Case-Control study of the Use of Mobile and Cordless Phones and the Risk for Malignant Melanoma in the Head and Neck Region. Hardell, L., et al. Pathophysiology 18(4):325-333 (2011).
8. Epidemiological Evidence for an Association Between Use of Wireless Phones and Tumor Diseases. Hardell, L., et al. PathoPhysiology 16(2-3):113-122. (2009).
9. Study on Potential Effects of "902 MHz GSM-type Wireless Communication Signals" on DMBA-Induced Mammary Tumours in Sprague-Dawley Rats. Hruby, R., et al. Mutation Research 649(1-2):34-44. (2008).

VI. DNA Damage and Gene Expression Changes

1. National Toxicology Technical Report on Cell Phones and Cancer.Toxicology and Carcinogenesis Studies in Sprague Dawley (Hsd:Sprague Dawley SD) Rats Exposed to Whole-body Radio Frequency Radiation at a Frequency (900 Mhz) and Modulations (GSM and CDMA) Used by Cell Phones. National Toxicology Program TR595:1-466. (2018). Summary: https://ntp.niehs.nih.gov/whatwestudy/topics/cellphones/index.html
2. Impact of radiofrequency radiation on DNA damage and antioxidants in peripheral blood lymphocytes of humans residing in the vicinity of mobile phone base stations. Zothansiama, M., et al. Electromagnetic Biology and Medicine 36(3):295-305. (2017).
3. Microwaves from Mobile Phones Inhibit 53BP1 Focus Formation in Human Stem Cells More Strongly Than in Differentiated Cells: Possible Mechanistic Link to Cancer Risk. Markova, E., et al. Environmental Health Perspectives 118(3):394-399. (2010).
4. Radiofrequency Radiation and Gene/Protein Expression: A Review. McNamee, JP., et al. Radiation Research 172(3):265-287. (2009).
5. Evaluation of HSP70 Expression and DNA Damage in Cells of a Human Trophoblast Cell Line Exposed to 1.8GHz Amplitude-Modulated Radiofrequency Fields. Valbonesi, P., et al. Radiation Research 169(3):270-279. (2008).
6. Gene and Protein Expression Following Exposure to Radiofrequency Fields from Mobile Phones. Vanderstraeten, J., et al. Environmental Health Perspectives 116(9):1131-5. (2008).
7. Nonthermal Effects of RadioFrequency-Field Exposure on Calcium Dynamics in Stem Cell-derived Neuronal Cells: Elucidation of Calcium Pathways. Rao, V.S., et al. Radiation Research 169(3):319-329. (2008).
8. Gene Expression Changes in the Skin of Rats Induced by Prolonged 35 GHz Millimeter-Wave Exposure. Millenbaugh, NJ., et al. Radiation Research 169(3):288-300. (2008).
9. DNA Damage in Molt-4 T-lymphoblastoid Cells Exposed to Cellular Telephone Radiofrequency Fields in Vitro. Philips, J., et al. Bioelectrochemistry and Bioenergetics 45(1):103-110. (1998).

VII. Neurological/Cognitive Effects

1. Early-Life Exposure to Pulsed LTE Radiofrequency Fields Causes Persistent Changes in Activity and Behavior in C57BL/6 J Mice. Broom, K., et al. Bio Electro Magnetics 40(7):498-511. (2019).
2. Are Rises in Electro-Magnetic Field in The Human Environment, Interacting with Multiple Environmental Pollutions, The Tripping Point for Increases in Neurological Deaths in the Western World? Pritchard, C., et al. Medical Hypotheses 127: 76-83. (2019).
3. Effect of 1800-2100 MHz Electromagnetic Radiation on Learning-Memory and Hippocampal Morphology in Swiss Albino Mice. Kishore, G., et al. Journal of Clinical and Diagnostic Research 12(2):14-17. (2019).
4. Monitoring of BALB/C Strain Mice Health, Investigation of Behavior, Hematological Parameters Under the Effect of an Electromagnetic Field. Zymantiene, J., et al. Medycyna Weterynarjna 75(03):158-163. (2019).
5. 2.45 GHz Microwave Radiation Impairs Learning, Memory, and Hippocampal Synaptic Plasticity in The Rat. Karimi, N., et al. Toxicology and Industrial Health 34(12):873-883. (2018).
6. Mobile Phone distance From Head and Temperature Changes of Radio Frequency Waves on Brain Tissue. Forouharmajd, F., et al. International Journal of Preventative Medicine 9(1):61. (2018).
7. A Prospective Cohort Study of Adolescents' Memory Performance and Individual Brain Dose of Microwave Radiation from Wireless Communication. Foerster, M., et al. Environmental Health Perspectives 126(7). (2018).
8. Electromagnetic Radiation 2450 MHz Exposure Causes Cognition Deficit with Mitochondrial Dysfunction and Activation of Intrinsic Pathway of Apoptosis in Rats. Gupta, S.K., et al. Journal of Biosciences 43(2) 263-276. (2018).
9. The Effect of Wi-Fi Electromagnetic Waves in Unimodal and Multimodal Object Recognition Tasks in Male Rats. Hassanshahi, A., et al. Neurological Sciences 38(6):1069-1076. (2017).
10. Effects of Short and Long Term Electromagnetic Fields Exposure on the Human Hippocampus. Deniz, O.G., et al. Journal of Microscopy and Ultrastructure 5(4):191-197. (2017).
11. Effects of Long Term Exposure of 900-1800 MHz Radiation Emitted from 2G Mobile Phone on Mice Hippocampus – A Histomorphometric Study. Mugunthan, N., et al. Journal of Clinical and Diagnostic Research 10(8):AF01-6. (2016).
12. Effect of Mobile Phone Radiation on Pentylenetetrazole-Induced Seizure Threshold in Mice. Kouchaki, E., et al. Iranian Journal of Basic Medical Sciences 19(7):800-3. (2016).
13. Effects of 3 Hz and 60Hz Extremely Low Frequency Electromagnetic Fields on Anxiety-Like Behaviors, Memory Retention of Passive Avoidance and ElectroPhysiological Properties of Male Rats. Rostami, A., et al. Journal of Lasers in Medical Science 7(2):120-125. (2016).
14. Short-Term Memory in Mice is Affected by Mobile Phone Radiation. Ntzouni, MP., et al. PathoPhysiology 18(3):193-199. (2011).
15. Use of Mobile Phones and Changes in Cognitive Function in Adolescents. Thomas, S., et al. Occupational Environmental Medicine 67(12):861-866. (2010)
16. Increased Blood-Brain Barrier Permeability in Mammalian Brain 7 Days After Exposure to the Radiation from a GSM-900 Mobile Phone. Nittby, H., et al. PathoPhysiology 16(2-3):103-12. (2009).
17. Effects of GSM 1800 MHz on Dendritic Development of Cultured Hippocampal Neurons. Ning, W., et al. Acta Pharmacoligica Sinica 28(12):1873-1880. (2007).
18. Neurological Effects of Radiofrequency Electromagnetic Radiation. Lai, H. Advances in Electromagnetic Fields in Living Systems 1:27-80. (1994).

VIII. Cardiovascular Effects

1. Exposure to cell phones reduces heart rate variability in both normal-weight and obese normotensive medical students. Alassiri, M., et al. Explore (NY). 16(4):264-270. (2020).
2. Assessment of electromagnetic fields, vibration and sound exposure effects from multiple transceiver mobile phones on oxidative stress levels in serum, brain and heart tissue. Usman, J.D., et al. Scientific African. 7(e00271). (2020).
3. Aluminium foil dampened the adverse effect of 2100 MHz mobile phone-induced radiation on the blood parameters and myocardium in rats. Kalanjati, V.P., et al. Environmental Science and Pollution Research. 26(12):11686-11689. (2019).
4. National Toxicology Technical Report on Cell Phones and Cancer.Toxicology and Carcinogenesis Studies in Sprague Dawley (Hsd:Sprague Dawley SD) Rats Exposed to Whole-body Radio Frequency Radiation at a Frequency (900 Mhz) and Modulations (GSM and CDMA) Use National Toxicology Program TR595:1-466. (2018). Summary: https://ntp.niehs.nih.gov/whatwestudy/topics/cellphones/index.html
5. Wi-Fi Is an Important Threat to Human Health. Pall, M. Environmental Research. 164:405-416. (2018).
6. Report of final results regarding brain and heart tumors in Sprague-Dawley rats exposed from prenatal life until natural death to mobile phone radiofrequency field representative of a 1.8GHz GSM base station environmental emission. Falcioni, L., et al. Environmental Research. 165:496-503. (2018).
7. Cardiovascular disease: Time to identify emerging environmental risk factors. Bandara, P., et al. European Journal of Preventative Cardiology. 24(17):1819-1823. (2017).
8. The effects of the duration of mobile phone use on heart rate variability parameters in healthy subjects. Ekici, B., et al. The Anatolian Journal of Cardiology. 16(11):833-838. (2016).
9. Effects of acute exposure to WIFI signals (2.45 GHz) on heart variability and blood pressure in Albinos rabbit. Saili, L., et al. Environmental Toxicology and Pharmacology. 40(2):600-605. (2015).
10. Electromagnetic fields promote severe and unique vascular calcification in an animal model of ectopic calcification. Shuvy, M., et al. Experimental and Toxicologic Pathology. 66(7):345-350. (2014).
11. The effects of prenatal exposure to a 900-MHz electromagnetic field on the 21-day-old male rat heart. Türedi, S. et al. Electromagnetic Biology and Medicine. 34(4):390-397. (2014).
12. Electromagnetic fields act via activation of voltage-gated calcium channels to produce beneficial or adverse effects. Pall, M.L. Journal of Cellular and Molecular Medicine. 17(8):958–965. (2013).
13. Electromagnetic fields produced by incubators influence heart rate variability in newborns. Bellieni, C.V., et al. Archives of Disease in Childhood – Fetal and Neonatal Edition. 93(4):F298-F301. (2008).
14. Radiofrequency/microwave radiation biological effects and Safety standards: A review. Bolen, S.M. Griffiss Air Force Base, New York: United States Air Force Materiel Command. 1-32. (1994).
15. Biological Effects of Radio Frequency Radiation in Eurasian Communist Countries. Adams, R.L., et al. U.S. Medical Intelligence and Information Agency. 1-35. (1975).

IX. Male Fertility

1. Long-Term Exposure to 4G Smartphone Radiofrequency Electromagnetic Radiation Diminished Male Reproductive Portential by Directly Disrupting Spck3-MMP2-BTB Axis in the Testes of Adult Rats. Yu, G., et al. Science of The Total Environment 698(133860). (2020).
2. Radiations and Male Fertility. Kesari, K., et al. Reproductive Biology and Endocrinology 16(118). (2018).
3. The Effect of 2.45 GHz Non-Ionizing Radiation on the Structure and Ultrastructure of The Testis in Juvenile Rats. Simaiova, V., et al. Histology and Histopathology 34(4):18049. (2018).
4. Modulatory Effect of 900 MHz Radiation on Biochemical and Reproductive Parameters in Rats. Narayanan, SN., et al. Bratislava Medical Journal 119(9):581-587. (2018).
5. Aloe Arborescens Juice Prevents EMF-Induced Oxidative Stress and Thus Protects from Pathophysiology in the Male Reproductive System In Vitro. Solek, P., et al. Environmental Research 166:141-149. (2018).
6. Radiofrequency Radiation (900 MHz)-Induced DNA Damage and Cell Cycle Arrest in Testicular Germ Cells in Swiss Albino Mice. Pandey, N., et al. Toxicology and Industrial Health 33(4) 373-384. (2017).
7. The Effects of Radiofrequency Electromagnetic Radiation on Sperm Function. Houston, BJ., et al. Reproduction 152(6):R263-R276. (2016).
8. Male Fertility and its Association with Occupational and Mobile Phone Tower Hazards: An Analytical Study. Al-Quzwini, O., et al. Middle East Fertility Society Journal 21(4):236-240. (2016).
9. Sperm DNA Damage – The Effect of Stress and Everyday Life Factors. Radwan, M., et al. International Journal of Impotence Research 28(4):148-154. (2016).
10. Electromagnetic Radiation at 900 MHz Induces Sperm Apoptosis through bcl-2, bax and caspase-3 Signaling Pathways in Rats. Liu, Q., et al. Journal of Reproductive Health 12:65. (2015).
11. Habits of Cell Phone usage and Sperm Quality - Does It Warrant Attention? Zilberlicht, A., et al. Reproductive BioMedicine Online 31(3):421-426. (2015).
12. In Vitro Effect of Cell Phone Radiation on Motility, DNA Fragmentation and Clusterin Gene Expression in Human Sperm. Zalata, A., et al. International Journal of Fertility and Sterility 9(1):129-136. (2015).
13. Extremely Low frequency Magnetic Fields Induce Spermatogenic Germ Cell Apoptosis: Possible Mechanism. Lee, S., et al. BioMed Research International 2014(567183). (2014).
14. Effect of mobile telephones on sperm quality: A systematic review and meta-analysis. Adams, J., et al. Environment International 70:106-112. (2014).
15. Effect of Electromagnetic Field Exposure on the Reproductive System. Gye, M., et al. Journal of Clinical and Experimental Reproductive Medicine 39(1):1-19. (2012).
16. Effects of the Exposure of Mobile Phones on Male Reproduction: A Review of the Literature. La Vignera, S., et al. Journal of Andrology 33(3):350-356. (2012).
17. Use of Laptop Computers Connected to Internet Through Wi-Fi Decreases Human Sperm Motility and Increases Sperm DNA Fragmentation. Avendano, C., et al. Fertility and Sterility 97(1):39-45. (2012).
18. Exposure to Magnetic fields and the Risk of Poor Sperm Quality. Li, D.K, et al. Journal of Reproductive Toxicology 29(1):86-92. (2010).
19. Mobile Phone Radiation Induces Reactive Oxygen Species Production and DNA Damage in Human Spermatozoa In Vitro. De Luliis, G., et al. PLoS ONE 4(7). (2009).
20. Radio Frequency Electromagnetic Radiation (Rf-EMR) from GSM Mobile Phones Induces Oxidative Stress and Reduces Sperm Motility in Rats. Mailankot, M., et al. Clinics (San Paulo) 64(6):561-5. (2009).
21. Cell Phones: Modern Man's Nemesis? Makker, K., et al. Reproductive BioMedicine Online 18(1):148-157. (2009).
22. Indicative SAR Levels Due to an Active Mobile Phone in a Front Trouser Pocket in Proximity to Common Metallic Objects. Whittow, WG., et al. IEEE Xplore 149-152 (2008).
23. Effect of Cell Phone Usage on Semen Analysis in Men Attending Infertility Clinic: An Observational Study. Agarwal, A., et al. Fertility and Sterility 89(1):124-128. (2008).
24. Cell Phones and Male Infertility: Dissecting the Relationship. Deepinder, F., et al. Reproductive BioMedicine Online 15(3):266-270. (2007).
25. Evaluation of the Effect of Using Mobile Phones on Male Fertility. Wdowiak, A., et al. Annals of Agricultural and Medicine 14(1):169-172. (2007).

X. Electromagnetic Sensitivity

1. Becoming Electro-Hypersensitive: A Replication Study. Dieudonne, M. Bioelectromagnetic 40:188-200. (2019).
2. Functional Brain MRI in Patients Complaining of Electrohypersensitivity After Long Term Exposure to Electromagnectic Fields. Heuser, G. et al. Reviews on Environmental Health 32(3):291-299. (2017).
3. "Hot Nano Spots" as an Interpretation of So-Called Non-Thermal Biological Mobile Phone Effects. Pfutzner, H. Journal of Electromagnetic Analysis and Applications 8(3):62-69. (2016).
4. Analysis of the Genotoxic Effects of Mobile Phone Radiation Using Buccal Micronucleus Assay: A Comparative Evaluation. Banerjee, S., et al. Journal of Clinical and Diagnostic Research 10(3):ZC82-ZC85. (2016).
5. Tinnitus and Cell Phones: The Role of Electromagnetic Radiofrequency Radiation. Medeiros, L., et al. Brazilian Journal of Otorhinolaryngology 82(1):97-104. (2016).
6. Microwave Frequency Electromagnetic Fields (EMFs) Produce Widespread Neuropsychiatric Effects Including Depression. Pall, M. Journal of Chemical Neuroanatomy. 7(Part B):43-51. (2016).
7. Subjective Symptoms Related to GSM Radiation from Mobile Phone Base Stations: a Cross-Sectional Study. Gomez-Perretta, C., et al. BMJ Open 3(12). (2013).
8. Green Communication- A Stipulation to Reduce Electromagnetic Hypersensitivity from Cellular Phones. Kumar, N., et al. Procedia Technology 4:682-686. (2012).
9. Electromagnetic Hypersensitivity: Fact or Fiction? Genius, S. et al. Science of the Total Environment 414(1):103-112. (2012).
10. Neurobehavioral Effects Among Inhabitants Around Mobile Phone Base Stations. Abdel-Rassoul, G., et al. NeuroToxicology 28(2):434-440. (2007).
11. Electrohypersensitivity: Sate-Of-The-Art of A Functional Impairment. Johansson, O. Electromagnetic Biology and Medicine 25(4): 245-258. (2006).
12. Electromagnetic Hypersensitivity: Biological Effects of Dirty Electricity With Emphasis on Diabetes and Multiple Sclerosis. Havas, M. Electromagnetic Biology and Medicine 25(4): 259-268. (2006).
13. Establishing the Health Risks of Exposure to Radiofrequency Fields Requires Multidisciplinary Research. Hietanen, M. Scandinavian Journal of Work, the Environment, and Health 32(3):169-170. (2006).
14. Hypersensitivity of Human Subjects to Environmental Electric and Magnetic Field Exposure: A Review of the Literature. Levallois, P. Environmental Health Perspectives 110(4):613-8. (2002).
15. Electric Hypersensitivity and Neurophysiological Effects of Cellular Phones – Facts of Needless Anxiety. Harma, M. Scandinavian Journal of Work, the Environment and Health 26(2):85-86. (2000).
16. Radiofrequency (RF) Sickness in the Lilienfeld Study: An Effect of Modulated Microwaves? Liakouris, A. Archives of Environmental Health: An International Journal. 53(3):236-238 (1998).

XI. Implanted Medical Devices

1. Ad Hoc Electromagnetic Compatibility Testing of Non-Implantable Medical Devices and Radio Frequency Identification. Seidman S., et al. Biomedical Engineering Online 12:71. (2013).
2. Electromagnetic Interference of Pacemakers. Lakshmanadoss, U., et al. Intech 229-252. (2011).
3. Interference Between Mobile Phones and Pacemakers: A Look Inside. Censi, F., et al. Annali Dell'Istituto Superiore di Sanità 43(3):254-259. (2007).
4. Electromagnetic Interference on Pacemakers. Erdogan, O. Indian Pacing and Electrophysiology Journal 2(3):74-78. (2002).
5. Electromagnetic Interference in Patients with Implanted Cardioverter-Defibrillators and Implantable Loop Recorders. Sousa, M., et al. Indian Pacing and Electrophysiology Journal 2(3):79-84. (2002).
6. Radiofrequency Interference with Medical Devices. A Technical Information Statement. IEEE Engineering in Medicine and Biology Magazine 17(3):111-4. (1998).
7. Cellular Telephones and Pacemakers: Urgent Call or Wrong Number? Ellenbogen, KA., et al. Journal of the American College of Cardiology 27(6):1478-9. (1996).

XII. 5G Effects

1. Millimeter (MM) wave and microwave frequency radiation produce deeply penetrating effects: the biology and the physics. Pall, M. Reviews on Environmental Health. 10.1515/reveh-2020-0165. (2021)
2. Model of Steady-state Temperature Rise in Multilayer Tissues Due to Narrow-beam Millimeter-wave Radiofrequency Field Exposure. Gajda, Gregory B., et al. Health Physics 117(3):254-266. (2019).
3. Untargeted Metabolomics Unveil Alterations of Biomembranes Permeability in HumanHaCaT Keratinocytes Upon 60 HGz Millimeter-Wave Exposure. Pogam, Pierre., et al. Scientific Reports 9(9343).(2019).
4. Ocular Response to Millimeter Wave Exposure Under Different Levels of Humidity. Kojima, M., et al. Journal of Infrared Milli Terahz Waves 40:574–584. (2019).
5. Millimeter Wave Radiation Activates Leech Nociceptors via TRPV1-Like Receptor Sensitization. Romanenko, S., et al. Biophysical Journal 116(12):2331-2345. (2019).
6. Systematic Derivation of Safety Limits for Time-Varying 5G Radiofrequency Exposure Based on Analytical Models and Thermal Dose. Neufeld, E., et al. Health Physics Society 115(6):705-711. (2018).
7. Towards 5G Communication Systems: Are There Health Implications? Ciaula, AD. International Journal of Hygiene and Environmental Health 367-375. (2018).
8. 5G Wireless Telecommunications Expansion: Public Health and Environmental Implications. Russell, C.L. Environmental Research 165:484-495. (2018).
9. The Human Skin As A Sub-THz Receiver – Does 5G Pose a Danger To It or Not? Betzalel, N., et al. Environmental Research 163:208-216 (2018).
10. The Modeling of the Absorbance of Sun-THz Radiation by Human Skin. Betzalel, N., et al. IEEE Transactions on Terahertz Science and Technology 7(5):521-528. (2017).
11. Human Exposure to RF Fields in 5G Downlink. Nasim, I. et al. Georgia Southern University (2017).
12. The Human body and Millimeter-Wave Wireless Communication Systems: Interactions and Implications. Wu, T., et al. IEEE International Conference on Communications (2015).
13. State of Knowledge on Biological Effects at 40-60 GHz. Drean, Y., et al. Comptes Rendus Physique 14(5):402-411. (2013).
14. Effects of millimeter waves radiation on cell membrane-A brief review. Ramundo-Orlando, Alfonsina. Journal of Infrared, Millimeter, and Terahertz Waves 31(12):1400-1411 (2010).
15. Human Skin as Arrays of Helical Antennas in Millimeter and Submillimeter Wave Range. Feldman, Y., et al. The American Physical Society 100(12):128102. (2008).

XIII. Wildlife and Plants

Wildlife

1. Increased aggression and reduced aversive learning in honey bees exposed to extremely low frequency electromagnetic fields. Shepherd, S., et al. PLoS ONE 14 (10):e0223614 (2019).
2. Exposure of Insects to Radio-Frequency Electromagnetic Fields from 2 to 120 GHz. Theilens, A., et al. Scientific Reports. 8(3924):1-10. (2018).
3. Anthropogenic radiofrequency electromagnetic fields as an emerging threat to wildlife orientation. Balmori, A. Science of The Total Environment 518-519: 58-60 (2015).
4. Magnetoreception in birds: the effect of radio-frequency fields. Wiltschko, R., et al. Journey of the Royal Society Interface. 12(103). (2015).
5. Anthropogenic radiofrequency electromagnetic fields as an emerging threat to wildlife orientation. Alfonso, B. Science of The Total Environment. 518-519:58-60. (2015).
6. Electrosmog and species conservation. Balmori, A. Science of the Total Environment 496: 314-316. (2014).
7. Drosophila oogenesis as a bio-marker responding to EMF sources. Margaritis, L, H., et al. Electromagnetic Biology and Medicine 33(3):165-189. (2014).
8. A review of the ecological effects of radiofrequency electromagnetic fields (RF-EMF). Cucurachi, C., et al. Environment International 51:116-140. (2013).
9. Ants can be used as bio-indicators to reveal biological effects of electromagnetic waves from some wireless apparatus. Cammaerts, MC., et al. Electromagnetic Biology and Medicine 33(4):282-288. (2013).
10. Exposure to cell phone radiations produces biochemical changes in worker honey bees. Kumar, N., et al. Toxicology International 18(1):70-72. (2011).
11. Mobile phone-induced honeybee worker piping. Favre, D. et al. Apidologie. 42:270-279. (2011).
12. Mobile phone mast effects on common frog (Rana temporaria) tadpoles: The City Turned inot a Laboratory. Balmori, A. Electromagnetic Biology and Medicine 29(1-12):31-35. (2010).
13. Changes in honeybee behaviour and biology under the influence of cellphone radiations. Sharma, V. P., et al. Current Science 98(10):1376–1378. (2010).
14. Briefing Paper on the Need for Research into the Cumulative Impacts of Communication Towers on Migratory Birds and Other Wildlife in the United States. Division of Migratory Bird Management (DMBM), U.S. Fish & Wildlife Service (2009).
15. Electromagnetic pollution from phone masts. Effects on wildlife. Balmori, A. Pathophysiology 16(2-3):191-199. (2009).
16. A possible effect of electromagnetic radiation from mobile phone base stations on the number of breeding house sparrows (Passer domesticus). Everaert, J., et al. Electromagnetic Biology and Medicine. 26(1):63–72. (2007).
17. Can Electromagnetic Exposure Cause a Change in Behaviour? Studying Possible Non-Thermal Influences on Honey Bees – An Approach within the Framework of Educational Informatics. Harst, W., et al. Acta Ststemica - IIAS International Journal. 6(1):1-6. (2006).
18. Possible Effects of Electromagnetic Fields from Phone Masts on a Population of White Stork (Ciconia ciconia). Balmori, A. Electromagnetic Biology and Medicine 24(2):109-119 (2005).

Plants

1. Lessons learned from the application of machine learning to studies on plant response to radio-frequency. Halgamuge MN, et al. Environmental Research 178(108634). (2019).
2. Exposure to 2100 MHz electromagnetic field radiations induces reactive oxygen species generation in Allium cepa roots. Shikha Chandel, et al. Journal of Microscopy and Ultrastructure 5(4):225-229. (2017).
3. Weak radiofrequency radiation exposure from mobile phone radiation on plants. Halgamuge, M.N. Electromagnetic Biology and Medicine 36(2):213-235. (2017).
4. Exposure to 915 MHz radiation induces micronuclei in Vicia faba root tips. Gustavino, B., et al. Mutagenesis 31(2):187-92. (2016).
5. Electromagnetic Fields Act Similarly in Plants as in Animals: Probable Activation of Calcium Channels via Their Voltage Sensor. Pall, M. Current Chemical Biology 10(1): 74-82. (2016).
6. Radiofrequency Radiation Injures Trees Around Mobile Phone Base Stations. Waldmann-Selsam, C., et al. Science of The Total Environment. 572(1):554-569. (2016).
7. Reduced growth of soybean seedlings after exposure to weak microwave radiation from GSM 900 mobile phone and base station. Halgamuge, MN., et al. Bio Electro Magnetics 36(2):87-95. (2015).
8. Impacts of radio-frequency electromagnetic field (RF-EMF) from cell phone towers and wireless devices on biosystem and ecosystem? A review. Sivani, S., et al. Biology and Medicine 4(4):202-216. (2012).
9. Adverse Influence of Radio Frequency Background on Trembling Aspen Seedlings. Haggerty, K. International Journal of Forestry Research 2010:836278. (2010).
10. Microwave irradiation affects gene expression in plants. Vian, A., et al. Plant Signaling and Behavior. 1(2):67–70. (2006).

XIV. Report, Articles and Reviews

1. Effects of non-ionizing electromagnetic fields on flora and fauna, Part 1 Rising EMF levels in the environment. Levitt, B.B., et al. Review on Environmental Health doi:10.1515/reveh-2021-0026 (2021).
2. Effects of non-ionizing electromagnetic fields on flora and fauna, Part 2 impacts: how species interact with natural and man-made EMF. Levitt, B.B., et al. Review on Environmental Health. doi: 10.1515/reveh-2021-0050. (2021).
3. Effects of non-ionizing electromagnetic fields on flora and fauna, Part 3. Exposure standards, public policy, laws and future directions. Levitt, B.B., et al. Review on Environmental Health 10.1515/reveh-2021-0083. (2021).
4. Risks to Health and Well-Being From Radio-Frequency Radiation Emitted by Cell Phones and Other Wireless Devices. Miller, A., et al. Frontiers in Public Health 7(223). (2019).
5. Commentary on The Utility of The National Toxicology Program Study on Cell Phone Radiofrequency Radiation Data for Assessing Human Health Risks Despite Unfounded Criticisms Aimed at Minimizing the Findings of Adverse Health Effects. Melnick, R. Environmental Research 168:1-6. (2019).
6. Pathological Findings Observed in the Kidneys of Postnatal Male Rats Exposed to the 2100 MHz Electromagnetic Field. Bedir, R., et al. Archives of Medical Research 49(7):432-440. (2018).
7. Mobile-Phone Radiation-Induced Perturbation of gene-Expression Profiling, Redox Equilibrium and Sporadic-Apoptosis Control in the Ovary of Drosophila Melanogaster. Manta, A., et al. FLY 11(2):75-95. (2017).
8. World Health Organization, Radiofrequency Radiation and Health – A Hard Nut to Crack (Review). Hardell, L. International Journal of Oncology 51:405-413 (2017).
9. Evaluation of the Protective Role of Vitamin C on the Metabolic and Enxymatic Activities of the Liver in the Male Rats After Exposure to 2.45 GHz of Wi-Fi Routers. Shekoohi-Shooli, F., et al. Journal of Biomedical Physics and Engineering 6(3):157-164. (2016).
10. Bees, Birds and Mankind: Destroying Nature by 'Electrosmog'. Warnke, U. Competence Initiative for the Protection of Humanity, Environment and Democracy (2009).
11. Biological Effects of Amplitude-Modulated Radiofrequency Radiation. Juutilainen, J., et al. Scandinavian Journal of Work, the Environment and Health 24(2):245-254 (1998).

Contact Us
Email: info@AmericansForResponsibleTech.org

© Americans for Responsible Technology is managed by Grassroots Communications, Inc., a non-profit organization.

Grassroots Communications
184 Main Street, Port Washington NY 11050
Tel. (516) 883-0887